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INTERNAL TEST: OCTOBER-2017

F. Y. B. Sc. (Semester-I)

Date: 06/10/2017, Friday Time: 1.30 P. M. To 2.30 P.M

Subject:- Inorganic Chemistry(US01CCHE02)

Note: (i) All questions are to be attempted. **Total Marks: 25**

(ii) Figures to the right of each question indicate full marks.

Q : 1 Give the correct choice to the following multiple choice questions. [3]

(i) If angular wave function is independent of angles θ and □ then, it represent _____ orbital.

(a) *f* (b) *d* (c) *p* (d) *s*

(ii) How many lone pairs are present on oxygen atom of water molecule?

(a) 0 (b) 1 (c) 2 (d) 3

(iii) Each molecular orbital is defined by four quantum numbers represented as _____ .

(a) n, l, λ, s (b) n, l, m, s (c) n, l, δ, s (d) none of this

Q : 2 Answers the following short questions(any two). [4]

(1)Define intervening electrons and electron probability function.

(2)Which compounds violet the octet rule? How?

(3)Give the order of energy of molecular orbitals for homonuclear diatomic molecules composed of lighter and heavier elements.

Q : 3[A]Write angular wave function $\Theta_{l,m}$ X Φ_m for *p* orbitals and also deduce their shapes. Given: $\Theta_{1,0} = \sqrt{\frac{3}{2}}\cos\theta$, $\Theta_{1,\pm1} = \sqrt{\frac{3}{4}}\sin\theta$,

$\Phi_0 = \frac{1}{\sqrt{2\pi}}$ and $\Phi_{\pm1} = \frac{1}{\sqrt{2\pi}}(\cos \quad \pm i \sin \quad)$ [4]

[B] Calculate σ and Z_{eff} for 4*s* electron in:- Mn (Z=25) [2]

OR

Q : 3[A] State de-Broglie's dual character of matter and derive de-Broglie's matter- wave equation. [3]

[B] Calculate the de-Broglie's wave length of carbon dioxide molecule moving with a velocity of 1.2×10^6 cm/sec at 300 K temp.

[Given: Atomic weight: C=12 g/mole, O=16 g/mole] [3]

Q : 4[A] Define hybridization. Discuss the sp^2 hybridization in BF_3molecule. [3]

[B] Explain 'octate rule' in detail with suitable illustrations which obey this rule. [3]

OR

Q : 4[A] Discuss the structure of NH_3 and gaseous PCl_5 molecules with on the basis of VSEPR-theory. [3]

[B] The shape of molecule is distorted in presence of lone pair of electron. Explain giving suitable examples. [3]

Q : 5[A] Oxygen molecule is paramagnetic in nature. Explain by MOT. [3]

[B] Distinguish between:
Bonding molecular orbital and Anti bonding molecular orbital. [3]

OR

Q : 5[A] State the rules for linear combination of atomic orbitals and how molecular orbitals are defined? [3]

[B] Sketch and explain the molecular orbital diagram for H_2 and He_2^+ ion. Calculate the bond order for both this species. [3]

BEST OF LUCK